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## DRAWINGS ATTACHED

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(54) IMPROVEMENTS IN OR RELATING TO THE  
 MANUFACTURE OF GARMENTS AND  
 GARMENTS PRODUCED THEREBY

(71) I, CARL WERNER, a citizen of the Confederation of Switzerland, of Via S. Giorgio 11, Castagnola, Tessin, Switzerland, do hereby declare the invention, for which I pray that a patent may be granted to me and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to a method for manufacturing a garment, in which method the steps of spinning textile fibers to form yarns, weaving the yarns to form a fabric, dressing the yarns and the fabric respectively and confecting the garment are avoided.

According to the invention there is provided a method for manufacturing a garment, in which a liquid binding agent is sprayed onto a former which is connected to the first pole of an electrostatic voltage source, the binding agent itself being electrically charged by the second pole of the voltage source, whereafter flock material, which is also electrically charged by said second pole of said voltage source is deposited on said former until a fleece fabric has been constituted and that the resulting fleece fabric structure is removed from the former after setting of the binding agent.

The invention also comprises a garment manufactured according to the above method.

A specific embodiment of the invention will now be described by way of example with reference to the accompanying drawing, the single figure of which illustrates schematically an apparatus for carrying out the method.

The apparatus includes a former 2 for a shirt mounted on a support 1, having a cylindrically shaped torso portion 3 made of metal sheet, two arm portions 4 abutting rectangularly to the torso portion 3 and closing the latter at its top end, and a collar portion 5 being cylindrically shaped and made of metal sheet also. The individual parts of the former 2 are suitably designed so that they are radially and

inwardly contractible and releasable from each other. All parts are electrically connected to earth across the support 1.

The apparatus further comprises a hitherto known device 6 for dusting and for electrostatically charging a fluid by means of a charging electrode 7, e.g. a rotating cap with a sharp circumference edge, which is connected to a pole 8 of a voltage source 9 of 20,000 V to 100,000 V. The other pole 10 of this voltage source is connected to earth as is the former 2 and therefore is provided with the same voltage potential as the former 2. Between the charging electrode 7 and the former 2, an electrostatic field is then built up.

Moreover, a hitherto known flocking device 11 is provided in the apparatus. It comprises a container 12 filled with flock (this consists of synthetic textile fibers being cut to a length of less than 10 mm), an electrode 13 connected to the pole 8 of the voltage source 9 and a blowing device 14 which supplies the flock from the container 12 in metered quantities past the electrode 13 into the electrostatic field between the electrode 13 and the former 2.

For manufacturing a shirt, the device 6 is first supplied with a liquid synthetic resin binding agent which includes a softener and which is supplied from the container 15. Thereafter, the device 6 is actuated to operate. The binding agent is then charged electrostatically in the region of the edge of the charging electrode 7, thereby being dusted into extremely fine droplets. Because of their electrostatic charge, these droplets are drawn towards the former 2 which itself is charged in the opposite sense. The droplets pass along the length of the lines of force extending from the charging electrode 7 to the former 2 and are deposited on the surface of the latter. These lines of force partly terminate at points on the averted side of the surface of the former 2 with respect to the charging electrode 7. Moreover, the former 2 is rotated about its

axis relative to the device 6 so that a uniform binding agent cover will result. Thereafter, the device 6 is switched off.

As long as the binding agent cover on the former 2 still remains in its liquid condition, the flocking device 11 is actuated to operate. In the flocking device 11, the flock fibers are blown from the container 12 by means of the device 14 past the electrode 13 which charges the flock material in the same sense as it already charged the binding agent droplets before. Because of the electrostatic charge of the former 2, and with the assistance of the air-blow generated by the device 14 at the commencement of the path of the flock, the flock fibers are bounced onto the surface of the former 2 which is covered with the binding agent, whereby a fleece fabric is formed having upstanding fiber ends.

Thereafter, the binding agent is caused to set, if necessary by means of introducing the former 2 into a drying chamber or in front of a heated-air blower, the softener which was added to the binding agent now serving to retain the flexibility and softness of the garment. The dosage is preferably chosen such that the flock fibers are fixedly bound together by the binding agent, yet voids are left between the fibers for assuring sufficient air permeability.

After the binding agent, and consequently the fleece fabric, has set sufficiently, the individual parts 3, 4 and 5 of the former 2 are contracted inwardly, released from each other and from the fleece fabric and finally removed.

According to the shape of the former 2, the resulting fleece fabric forms a seamless garment, e.g. a shirt. Such a shirt may be bordered at its rims and provided with closing means, decorations or ornaments.

For providing a front opening 16 in the collar portion and the breast portion of the shirt, the respective parts 3 and 5 of the former 2 may comprise a slot 16 of a few mm in width. In the region of this slot 16, no binding agent and flock material is desposited. Therefore, the shirt is provided *a priori* with the opening required in this region.

In this region, a zipper closure, e.g. one with hidden link rows, may be provided on the former 2 before the binding agent is deposited on the form. Therefore, the support ribbons

of the zipper closure will underlie the binding agent covering and are bound with the fleece fabric by the binding agent.

The garment may either be dyed in the finished state or predyed flock material may be used.

Depending on the chosen type of binding agent and flock material, garments are manufactured which may be either thrown away after one use because of their low value or which may be subjected to washing and cleaning processes if their value is chosen to be higher.

#### WHAT WE CLAIM IS:—

1. A method for manufacturing a garment, in which a liquid binding agent is sprayed onto a former which is connected to the first pole of an electrostatic voltage source, the binding agent itself being electrically charged by the second pole of the voltage source, whereafter flock material, which is also electrically charged by said second pole of said voltage source is deposited on said former until a fleece fabric has been constituted and that the resulting fleece fabric structure is removed from the former after setting of the binding agent.

2. A method according to claim 1, in which a metal former is used.

3. A method according to claim 1, in which a hollow former provided with cut-out sections is used, in order to provide the fleece fabric structure with respective cut-out sections.

4. A method according to claim 1, in which a flock consisting of synthetic fibres is used.

5. A method of manufacturing a garment substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

6. Apparatus for manufacturing a garment substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

7. A garment manufactured by the method and apparatus as claimed in any preceding claim.

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